

MEETING REPORT

LIVING IN A LOW CARBON WORLD: THE POLICY IMPLICATIONS OF RATIONING

30th June 2005, Policy Studies Institute, London

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August 2005

Event organised and sponsored by:



UKERC
The meeting place

Executive Summary

This meeting report summarises the presentations and discussions at “Living in a low carbon world: the policy implications of carbon rationing” – a one day seminar held on Thursday 30th June 2005 at the Policy Studies Institute, London. The key purpose of this day was to raise the profile of carbon rationing and to explore what its introduction would mean for key sectors of society and the economy.

The urgent challenge of climate change and the need for more radical policies was introduced by Mayer Hillman, Tina Fawcett and Colin Challen MP. Following this, six distinguished speakers identified how personal carbon rations would affect different aspects of society and the economy.

Roger Levett began by speaking about the role of the planning system in creating a lower carbon society. He concluded that more not less planning would be required, and that it must be ‘systems literate’. Reducing emissions requires a vigorously interventionist approach, upfront and unapologetic that some collective goals, notably climate security, require restrictions of some individual choices, especially ones that increase car and air travel. Tony Grayling reported on transport, and identified technological and behavioural routes to lower emissions. He concluded that deep reductions in emissions from transport achieved gradually over a period of decades may not necessarily mean drastic reductions in the amount of personal travel and freight transport. The effect of carbon emissions limits on transport patterns will depend on the development and deployment of new vehicle and fuel technologies, as well as changing behaviour.

Chris Jardine looked at options for carbon saving within the domestic sector, and considered whether the introduction of personal carbon rations would be sufficient to encourage people to adopt additional efficiency measures and household-level renewables. He concluded they could be very effective under the right circumstances. Robin Stott spoke about the health impacts of living in a lower carbon society. He suggested a low carbon world would be very positive, as it would involve more use of human energy (walking and cycling), better sources of food, and increased social engagement, all of which would reduce ill-health. In addition, the income redistribution effects of carbon rations would help reduce health inequalities.

Caroline Lucas MEP gave a wide-ranging presentation on the economy, employment and politics. She suggested that a low carbon economy would present many new employment opportunities in various sectors. The audience was left with three key questions. Firstly, what are the implications of a low carbon future for growth in the developing world? Secondly, what is the optimum area in which to introduce carbon rationing – UK, EU, OECD? Finally, how can workers who lose out in the transition to a lower carbon economy be supported?

George Monbiot discussed the wider political context in which carbon rationing sits. He stressed that voluntarism could not be effective in making the huge carbon savings required. Regulation and compulsion are necessary. People need to press the government to take the lead, but for this to happen climate change must become the biggest political issue in the industrialised world. He suggested it would be necessary to identify ‘enemies’ who are blocking the way to a low carbon economy, and take the fight to them, to get effective public engagement with the issue.

Throughout the day the audience contributed to the debate and raised many interesting issues which are detailed in the main report. Key discussion points included the following:

- The language used to describe policy tools based on carbon rationing could be important for political acceptability. For example, ‘rationing’ might make people think of say food rationing during the dark times of the second world war,

whereas terms such as 'citizens emissions reduction shares' places emphasis on a positive equity-based good.

- Several participants suggested a 'war on carbon' mentality would be needed before significant carbon cuts could be made. The use of this language drew both strong objections and strong support.
- The need for a greater role for communities and cities in delivering carbon reductions

The following topics were suggested in the final discussion session.

- A good area for research would be at the city-region level – how can such a scale of community achieve an 80% cut in its emissions? (**Roger Read**)
- Identify what legislation needs to be put in place to rule out what is unacceptable in carbon terms (**Trewin Restorick**).
- GAP has an Eco-teams database, where households from all over the country are in-putting data on actual energy use and degree days. He offered to make these data available for research (**Trewin Restorick**).
- What would the price of carbon have to be to make people change their habits?
- Is there a good link to be made between 'peak oil' and climate change? It was suggested the peak oil issue has spurred people into action in North America.
- A 'systems literate' approach is needed, looking at the way decisions and changes in one policy area affect others in a dynamic way, and trying to identify the 'tipping points' that determine whether people choose sustainable or unsustainable options. (**Roger Levett**).
- Three key areas for further research can be identified: DTQs and EU Emissions Trading System; DTQs and IT; and DTQs and fuel poverty (**Richard Starkey**).
- How far will rationing itself do the trick, or do we still need to reinforce its effectiveness with, for instance building regulations? (**Derek Osborn**).
- A clearer programme of what we want the government to do on carbon allowances, and the pace of change that this entails needs to be identified (**Derek Osborn**).

Proceedings were closed by Derek Osborn who drew together the main themes of the day and reflected upon conclusions drawn by the speakers. He took inspiration from Churchill to summarise the main message of the conference: ACTION THIS DAY.

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Introduction to the event

This document summarises the presentations and discussions at “Living in a low carbon world: the policy implications of carbon rationing” – a one day seminar held on Thursday 30th June 2005 at the Policy Studies Institute, London. The key purpose of this day, sponsored by Policy Studies Institute and the UK Energy Research Centre, was to raise the profile of carbon rationing and to explore what its introduction would mean for key sectors of society and the economy. It was hoped that it would provide a starting point for continuing dialogue and action and contribute to building a community of interest around the concept of personal carbon rations.

Six expert speakers addressed the seminar, and each of them has provided a summary of the thoughts they presented on the day. The speakers were asked to imagine that it was 2015 and personal carbon rations had already been introduced. Then they were asked to discuss what the impacts for their sector of activity could be under a reducing national carbon cap. What would change? What might be the balance between technology, behavioural and structural change? How would changes in the rest of society affect their sector? What would be the benefits of living in a lower carbon world (apart from reducing climate change)?

Mayer Hillman, Tina Fawcett and Colin Challen MP introduced the event, and Derek Osborn provided a summing up – summaries of their remarks are also included.

Contributions from the expert invited audience were a very important aspect of the day. A number of themes emerged across several discussion slots: the interaction of carbon rationing with other policy measures, localisation of the economy, the use of a ‘war on carbon’ metaphor and the role of choice in decision-making about climate change. Key points which arose in discussion have been recorded at the end of each session.

Some of the themes from the seminar have been reported in The ENDS Report 366, July 2005.

If you want to get in touch to discuss any of the issues raised in this report, you can contact Mayer Hillman and/ or Tina Fawcett:

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This document was edited by Mayer Hillman and Tina Fawcett. Contributors include all the speakers at the seminar as well as Gavin Killip who recorded and summarised the audience discussions.

A brief introduction to personal carbon rationing

Mayer Hillman, Policy Studies Institute, London.

Tina Fawcett, Environmental Change Institute, University of Oxford & UKERC

Summary

Personal carbon rationing would be a UK-wide allowance system covering the carbon emissions generated from the fossil fuel energy used by individuals within the home and for personal transport, including carbon equivalent emissions from air travel. It would account for around half of current UK carbon emissions from energy. The primary aim of the scheme would be to deliver guaranteed levels of carbon savings in successive years in an equitable way. The government’s current target of a 60% reduction by 2050, or more stringent targets, would assuredly be met in this way.

Key features

The main features of personal carbon rations (the word 'rations' is used for clarity though 'DTQs', 'allowances', 'entitlements' or 'quotas' could equally well be used) are:

- An **equal annual ration** is allocated for each adult, with a smaller one for children
- Rations are **tradable**
- The ration covers the direct **energy used in the household and for personal travel**
- A phased **year-on-year reducing ration** is signalled well in advance
- The **arrangement is mandatory**, with Parliamentary approval,.

Within a scheme of **equal rations**, it might be thought necessary to give additional rations to some vulnerable people such as the elderly or fuel poor. However, in the longer term, it would make more sense for the government to subsidise efficiency and/or renewable energy measures for them rather than give them extra allowances. This is because the more exceptions that are made, the lower the available ration has then to be for everyone else.

Trading on the open market will be an integral part of the carbon rationing scheme as the carbon ration necessary to cover *current* consumption will vary considerably between individuals. Those who lead lives with a relatively low energy input by investing in household efficiency, renewables, and by travelling less will not need all of their ration and will therefore have a surplus to sell. Those who live in large or inefficient homes or who travel a lot, will need to buy this surplus to permit them to continue with something like their accustomed lifestyle. In addition, by incorporating trading within the rationing scheme, economic theory suggests that savings are likely to be made at least overall cost.

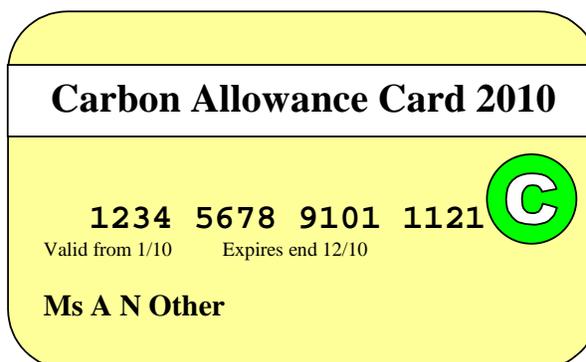
Personal carbon rations would cover everyone's direct **use of energy in the household and for personal transport**, including air travel. By including all these activities, half of the energy-related carbon and carbon equivalent emissions in the UK economy would be covered. In addition, combining energy use in the household with personal transport in a single scheme would give people flexibility in how they use their ration.

Carbon rations will have to decrease over time in response to the need to reduce global emissions in a smooth transition and to allow for the expected rise in national population. To allow for the expected growth in the UK population, personal rations would have to fall by a little more than 60% below today's average by 2050 (designed to stabilise atmospheric carbon dioxide concentrations at 550ppm). If a more risk-averse target for concentrations of 450ppm were chosen, then the reductions needed by 2050 would be around 80%.

In order to be effective, **carbon rationing would have to be mandatory**. A voluntary approach would not succeed: the 'free-rider' would have far too much to gain.

Carbon rationing in practice

Administration should be straightforward. Each person is given an electronic card containing the year's carbon credits. It would have to be presented for deduction of the correct amount of carbon on purchase of energy or travel services. The technologies already in place for direct debit and credit cards could be used. There are relatively few sellers of gas, electricity, petrol, diesel and other fuels, and flows of fossil fuels are already very well recorded



and tightly regulated in the economy – thereby easing introduction of such a system.

Benefits of personal carbon rations

The most important benefit of carbon rationing is that it provides a framework for assuredly delivering government targets for carbon reductions. Current policies do not do this. Second, it does so in an equitable way – everyone has an equal share of the UK's emission allowances. There are also other benefits, for example, under carbon rationing, the carbon 'market' will reflect the advantages of using renewable energy, household insulation and low carbon methods of transport. No longer will it be necessary to have separate government policies and programmes to promote everything from taking up cycling to buying efficient refrigerators. For individuals, carbon rationing will provide choice, allowing people to reduce their emissions in the way that suits them best - whether through technical efficiency improvements and using more renewable energy, or through behaviour/lifestyle changes such as turning down thermostats and holidaying closer to home. People opting for lower carbon lifestyles will be rewarded by being able to sell their spare rations. Their value will rise steadily as the yearly ration is reduced, thereby creating an ecologically virtuous circle.

The international context

Personal carbon rationing as a UK solution emerges from the Global Commons Institute's key global framework proposal - "**Contraction and Convergence**" (Meyer 2000) - see also <http://www.gci.org.uk/briefings/ICE.pdf>. This is aimed at delivering global carbon savings fairly and with certainty. It will do this by first agreeing a contraction of global carbon emissions to ensure that a 'safe' concentration of emissions in the atmosphere is not exceeded, and second, converging to equal *per capita* emissions allowances, by an agreed year. Carbon rationing is designed as a policy which will enable the UK to make national savings as its contribution within a global agreement on limiting greenhouse gas emissions based on the same principles of **C & C**.

Further reading

The arguments in favour of carbon rationing, and a vision of what a society with rations would look like are developed in detail in:

Hillman, M. & Fawcett, T. 2004, *How we can save the planet*, Penguin Books, London.

A similar scheme across the whole economy called 'Domestic Tradable Quotas' (DTQs) has been proposed. For details see: Anderson, K. & Starkey, R. 2004, *Domestic tradable quotas: A policy instrument for the reduction of greenhouse gas emissions*, Tyndall Centre for Climate Change Research, Norwich.

Meyer, A. 2000, *Contraction and convergence: the global solution to climate change*, Green Books, Totnes, UK.

INTRODUCTORY SESSION

Brenda Boardman, the Chair of the event, opened the meeting and set out the programme for the day. Then **Malcolm Rigg**, the Director of the Policy Studies Institute, welcomed speakers and guests.

Introduction – part 1

Mayer Hillman (Policy Studies Institute)

Last year, Penguin published our book ***How we can save the planet***. All that has happened since then appears to reinforce its emphatic conclusions:

1 *Current fossil fuel-based lifestyles must be drastically changed to limit carbon dioxide concentrations in the atmosphere and thereby the harsher impacts of climate change.*

The Exeter Conference of international climate scientists in February and the recent statement of the Joint Science Academies added to the already extreme concern on the subject.

2 *A blind eye is being collectively turned to the gross insufficiency of action being taken in the face of this calamitous prospect.*

The public is in denial on this most critical of issues, carrying on deluding itself that our energy profligate activities, let alone their spread, as reflected for instance in the continuing rise in road, rail and air travel, do not have to be curtailed urgently. Even well-informed people would, albeit reluctantly, admit to excesses in this regard. Ask anyone what they intend to do in retirement, and the great majority will say “see the world”. Ask anyone whether they think government will be prepared to curtail choice to that end, and they will say “no”, glibly and outrageously implying that we are too selfish to save the planet.

Most of the green lobby plays along with campaigns clearly designed to avoid alarming the public too much as to the true extent of necessary change - *Friends of the Earth* currently stating that ‘we all need to act’, calling for a personal annual reduction in CO₂ emissions of no more than 3%, and without even indicating a global context. At that rate, the target of emission reduction that it agrees to be essential would be reached far too late to avoid catastrophe.

The media, while featuring alarming evidence of climate change, brazenly promotes fuel-use intensive attractions, such as second homes overseas, the Olympics (in any city), international tourism and gas-guzzling cars. No doubt, the need for revenue from advertising explains this but, even if noticed, the crude contradiction is treated as a joke.

Industry continues to act as if investment in energy efficiency programmes, the development of a hydrogen-based economy, carbon sequestration, and a renaissance in nuclear power, will *necessarily* deliver a sufficiently effective target for reducing emissions. Confidence in its capacity to do so in time can hardly be gained from its progress to date.

Meanwhile, the government wilfully continues to hold to the view, in the face of the evidence, that economic growth and protection of the global environment are reconcilable objectives when it is clear that this growth is too closely coupled to greenhouse gas emissions for this to be possible. It has yet to acknowledge the inappropriateness of the use of market forces as a means of regulating the use of a basic commodity that is finite. And it remains wedded to its wholly inadequate target of a 60% reduction in CO₂ emissions by 2050 at a concentration way beyond what the consensus

of climate scientists, including its own expert advisers, has established to be essential if the runaway effect of global warming is to be prevented.

3 *The only policy that can prevent the 'safe' concentration of carbon emissions accumulating in the atmosphere being exceeded is the global framework proposal of the Global Commons Institute - **Contraction and Convergence** - the contraction of emissions combined with a programme of convergence towards an annual per capita ration for the whole population.*

Support for **C&C** is growing so *rapidly* - all the main political parties, with the exception of Labour, now do so (as does the Royal Commission on Environmental Pollution, the Synod of the Church of England, the House of Commons' Environmental Audit Committee, to list but a few prominent bodies) - that it is difficult to believe that a consensus will not be reached very soon to ensure no interruption to all-party agreement on its long-term and immutable adoption and to its early introduction in the form of a steady annually reducing carbon ration.

4 *This rationing will have to be mandatory as the considerable scale of reduction will not be achieved within the timescale available through the medium of a voluntary approach based on education and appeals to people's duty to behave responsibly - combined with alerting them to the cost-effectiveness of fuel-saving practices.*

The most important benefit of personal carbon rationing is that it will provide a framework for assuredly delivering the essential reduction needed in carbon dioxide emissions and in an equitable way. The parallel with food rationing during WWII is instructive: it was not done as a plea to altruism, it was obligatory for everyone to comply. It will drive forward green practices by industry as well as by individuals far more efficiently than by industry seeking support and subsidy for its work. There are other benefits too: these include the issue of social justice, in particular with regard to the Third World and Africa. The government will no longer need to determine a notional value for a tonne of carbon or to have separate policies and programmes to encourage individuals to be good citizens: they will choose the way that suits them best for reducing their emissions - whether through buying into energy saving measures or through changes such as making locational decisions enabling local patterns of travel to be adopted, holidaying closer to home – or not using seven years of their ration to fly to Australia! Trading in the carbon 'market' will encourage this as people opting for lower carbon lifestyles will be rewarded by being able to sell their spare rations, the value of which will rise steadily as the yearly ration is reduced. The process will create an ecologically virtuous circle.

There can be little doubt that the scope for adopting practices allowing for perfectly reasonable lifestyles under a carbon rationed regime is considerable.

Introduction - part 2

Tina Fawcett (Environmental Change Institute & UKERC)

Personal carbon rations / allowances are a means to guarantee carbon savings from personal energy use in an equitable way. Rationing would cap carbon emissions from private individuals' direct energy use within their homes and for travel (including all air travel – national and international). Rations would be equal, tradable and mandatory and would reduce over time. They would cover about 50% of carbon and carbon equivalent emissions in the UK; another mechanism would be needed to tackle the other 50%.

Currently personal carbon emissions vary hugely. A limited pilot study showed a factor of more than ten difference between individuals' annual emissions. This variation in current emissions shows that there would be many 'winners' as well as many 'losers' under a rationing system. We do not yet understand well enough the distributional impacts of

introducing carbon rations, or how this would compare with an alternative policy such as massive carbon taxation.

There are many details of carbon rations yet to be worked out, and questions about their impacts, costs, administrative feasibility and political and social acceptability remain. However, these questions will be pursued through ongoing research and future seminars and consultations. Today is not about the details of carbon rationing, but about the bigger picture. How will carbon constraint become part of the way we live our lives? What will a low-carbon society and economy be like? How will we live in a low carbon world?

Musings on the politics of carbon rationing

Colin Challen (MP for Morley & Rothwell)

In considering the wider implications of the introduction of carbon rationing, two chicken and egg questions stand out. Are we too selfish to support it or even allow it to happen? And does it not entail the emergence of a new type of politics?

Looking at this from another angle, isn't it clear that the new politics of collective responsibility must precede its introduction. Is it not rather more likely in the present ethos which extols individual materialism, that we will fail to make the huge changes needed in the timescale available - in the absence that is, of either a cataclysmic event or an unprecedented non-violent shift in public attitudes?

Humans do have the capacity to make enormous changes. In order to try to understand how we could mobilise a carbon *lite* economy, we could do worse than study how the industrialised economies transformed themselves into war economies. Of course they did not cease to be industrialised economies, since war is one of the greatest progenitors of industrialisation. However, my point is that the whole engine of production can be shifted in relatively short periods of time if the external threat is great enough. After Pearl Harbour, car production in the United States ceased within 12 months, with manufacturing plant being turned over to the war economy. The car manufacturers objected but they had to bend to the political imperative.¹

At present, the effect of climate change seems to be rather less horrendous to the general public than the prospect of aerial bombing. We know that the effects of climate change will hit others first – hence our ecological debt to the developing world – and many of us in the West know we will be able to buy time with the present day equivalent of air raid shelters, that is mitigation measures which will help us to continue to live comfortably without taking the decisive action that is required.

If we cease to be selfish, a new style of politics will emerge. This could happen overnight – the equivalent of Chamberlain's declaration of war and mobilisation of our forces. But it is more likely to happen over a much longer period: attempts will be made to delay the inevitable departure from business as usual for as long as possible - the equivalent of Chamberlain's earlier policy of appeasement.

We are currently in the climate change appeasement period. Most people want to get on with their lives. As long as climate change only makes a significant impact on little countries a long way away 'about which we know nothing' and care even less, then we will only make relatively minor changes. The body politic has an overwhelming urge to carry on business as usual, it fears urgent or unplanned shifts.

Even after Chamberlain's belated call to arms in 1939, let's remember that there were many well placed, influential figures who wanted to do deals with the fascist regimes, to

negotiate a peace during what was dubbed 'the phoney war'. This leads me to another concern – that the new politics which must be marshalled in the climate change crisis will always have its detractors. They will point to any straw blowing in the wind which shows that there may even be benefits from climate change – for us that is - that we may even get some comparative advantage, or that pursuing a harder line weakens our comparative advantage. Ironically the detractors will not lose any power if our anti-climate change policies work. Indeed they could even gain momentum as people begin to question whether their sacrifices were really necessary in the first place. That was certainly the case in 1940, as anyone who has read Clive Ponting's excellent book on the year 1940 will know.²

After all, the reward for defeating climate change is merely that things won't get any worse in a vague, global sense. But many people will definitely think things got worse for them personally, if for example they had to give up their car. We are asking people to be counter-intuitive – that is to give up now to receive later, when all our consumer messaging is about getting now and paying later. It is difficult to see how a political message in a climate of cynicism, not to say distrust of politicians, could effectively convey what needs to be done whilst that message is countered by consumer advertising. Tony Blair has repeatedly said that climate change is at the top of the G8 summit's agenda. But even if people are remotely interested in the subject, this will have little meaning for them. How do you translate the discussion about climate change at Gleneagles into a discussion around your family table? Not least if you aspire to be a 'Chelsea tractor' mum and your son comes in wearing a hoodie?³

We should study the components of what it takes to wage total war when we live in a democracy made up of selfish individuals. One of the first questions must be how fast can we introduce conscription? Voluntarism is not working. If the answer is tomorrow, then tomorrow we will have the new politics – whether some people like it or not. The elements of this form of conscription, that is the enforcement of carbon rationing or quotas for the adult population, will not be popular, but I would wager that if the government successfully pulls off the feat of re-introducing ID cards in the UK, the move to carbon quotas will be made very much easier.

This might sound like a surprising prediction. But by virtue of the fact that ID cards could eventually become compulsory for every adult, (and of course people are likely to be quite averse to having to pay a sizeable sum for this imposition) we will be taking a very important component from the armoury of total war and putting it into place. This is perhaps the first step that must be taken, since it will be the first time for a long time that the government has said to every individual 'you must do this' because we have decided it is good for the state (and world) of which you are a part. Selfish people may or may not like ID cards. But ID cards signify an individual's contract with the state, a contract which can only be made void by permanently emigrating, for most people there can be no escape. ID cards underpin the notion of citizenship, even a sense of belonging, and this sense is an essential requirement if selfishness is to be defeated. I believe ID cards are an option which must be taken

Let's consider another aspect of the politics of carbon rationing which also touches on the issue of selfishness and is another component of the total war that must be fought against climate change. This is that the economy has to be transformed with the objective in mind not of creating growth but being less carbon-reliant, year on year. Obviously this means stopping doing bad things and starting doing good things. There is a role for technology here, and I have to say I do not have any quibbles with Bush's agenda to increase expenditure on research into things like hydrogen, albeit with the caveat that his is a limited agenda since it is only about trying to reduce carbon intensity relative to GDP, not to reduce carbon emissions *per se*.

The point I want to make is that whatever we do, we need to maintain high employment, and technology *may* offer us that possibility. Consider the future of electricity distribution: a metaphor would be the digital switch-over when one long standing system gives way to another, and that change leads to the diminution of dominant TV stations (think power stations) and we get a multitude of smaller ones, *aka* microgeneration. This calls for a revolution in power distribution which will have far reaching consequences. Now I think it is the turn of the electricity generators who, like the media moguls in their own industry, will be powerless to resist change.

One of the main explanations for the reduction in UK greenhouse gas emissions in the late eighties and early nineties was the destruction of much of our manufacturing base. We all decried the growing service economy then, but it turned out to be greener. If we look at the carbon *lite* economy of the future, it will have to be very much more service-based. This means improving and developing the things we have, making them last longer, and improving the image of those who do this work. It means a fundamental shift to re-use and re-cycling. The EU has already made a good start, for example by specifying the amount of vehicle content that must be reusable. The challenge will be to see how re-use can be combined with innovation.

If we did not maintain high employment, there would be a huge reaction against the policies we advocate to reduce greenhouse gas emissions. Human beings are creative and productive animals. We will fail to reduce carbon emissions if our policy is merely to switch to inactivity. We have to have intelligent activity. So, at the risk of sounding like a new Labour clone, let me say that the third strand of our policies in the next ten years, as we head towards the carbon rationed future, has to be education followed by education and education.

Education, let's be blunt, is the greatest service industry there is. It is also the greatest economic lever that we have. If we are to transform our economy into a low carbon economy whilst maintaining high levels of employment, it will only be because we invested considerably more in higher education. But I also think this means that the government has to be more selective about how it invests in it. It has to say that some subjects are vastly more important to our national purpose than others. For example, maths and physics, the cornerstones of engineering, are crucially important. Whatever the technologies are that emerge in the next twenty years which deal with climate change, they will be built on the basis of knowledge in these areas. At the moment we are failing and it is one of those sad little illustrations of where joined-up government simply doesn't exist.

I would like to think that in the age of carbon rationing, our greatest bulwark against any selfish reaction from the public would be education. We would need to do some things differently. It may be for example that the gap year would become a compulsory component of a university or college education, spent at the taxpayer's expense in areas of environmental or development work. If we can broaden students' horizons, so much the better, especially if it means them not making the obligatory round the world flight for less than a thousand pounds. Gap years need not be confined to the student population of course, but should be extended to the whole working population. This will be the 'holiday of a lifetime.' After all, members of the Territorial Army more or less do it already.

That brings me back to my running metaphor. One thing which I have perhaps failed to mention in my reference to total war as a metaphor in this struggle against climate change is that this time we are the aggressors.

References

1 Lester R. Brown, *Rescuing a Planet Under Stress and a Civilisation in Trouble*, Earth Policy Institute, 2003.

2 Clive Ponting, *1940: Myth and Reality*, Hamish Hamilton, London 1990

3 Anthony Pratkanis and Elliot Aronson, *Age of Propaganda: The everyday use and abuse of persuasion*, WH Freeman and Co. New York 1991.

Unless we understand the concept of 'cognitive dissonance' we are doomed to failure. The propagandists rule the world because they rule our dreams (Colin Challen, 2005).

SESSION 1: PLANNING, TRAVEL AND TRANSPORT

Implications for planning

Roger Levett (Partner, Levett Therivel, Sustainability Consultants)

If there was an effective carbon rationing system in place, sensible people would seek homes and lifestyles where they could be confident of continuing to enjoy a good quality of life with a steadily diminishing carbon bubble. Suddenly, the kinds of places which plans and planners have forlornly promoted in the teeth of consumer preferences and market logic - energy efficient, high density urban housing, with daily amenities within easy walking or cycling distance, and good public transport - would be what everyone will want.

Does this make planning redundant as a tool for sustainable communities? Couldn't we just leave individual decisions motivated by carbon frugality to add up to sustainable communities, just as they did for centuries before we had planning? No, because we are starting not from a clean slate but from unsustainable living patterns which are both entrenched and self-reinforcing.

We drifted into unsustainability through the mutually reinforcing effects of individually perfectly sensible decisions: decisions to move to suburbs, which left inner urban areas less attractive to remaining residents who then also tried to move out; decisions to drive which made the bus service decline, encouraging more people to abandon it, and which encouraged more businesses to move to locations only easily accessible by car.

But we can't drift back, because we are now in the grip of several interlocking vicious circles. Planning policies to push development to sustainable locations have limited effects because people don't want to live in inner urban areas because the environment and local public services are perceived as crummy. Businesses don't want to be there because of congestion and parking problems. Even when public transport is subsidised to high quality, few drivers switch to it because it still can't match the car for complex journeys between fragmented locations. Serious disincentives or restrictions to driving are politically unacceptable while land use patterns are so dispersed, and public transport so poor, that many people do indeed need to use their cars to get a reasonable quality of life.

The three components - sustainable spatial patterns, good public transport and car restraint are each a precondition for the practicability and success of the other two. We can only make *any* of them work if we do them *all*. And we have to make them all work, because carbon rationing is only going to win public support if it comes packaged with convincing and attractive pathways to more sustainable lifestyles. Co-ordinating interventions to offer practicable and attractive pathways to low-carbon lifestyles is therefore the job planning must do.

The solution to the problem of interdependence is to isolate relatively self-contained parts of the human/settlement system where the vicious circle could be flipped into a virtuous circle, with vicious feedbacks held at bay sufficiently to allow a different self-reinforcing dynamic to become established.

This would be easiest in new developments big enough to establish their own internal patterns of economic life, service provision and movement as well as built form. Sustainable settlements such as Vauban in southern Germany show that normal people are happy to 'buy in' to a package which includes building to extremely high energy efficiency, buying heat and power only from the on-site plant at a tariff designed to

discourage use, and paying a steep extra charge for a parking space at some distance from their home if they wish to own a car, in return for the benefits - including for example a good on-site kindergarten that 5 year olds can safely walk to unescorted.

At a smaller scale, BedZed in south London demonstrates the same: property prices are higher than would be expected for 'standard' accommodation at the same places. Two hundred years ago, Edinburgh's New Town showed that intrusive interference with how people live can be an attraction: its middle class residents were delighted to comply with its elaborate codes and standards of design, maintenance and plumbing because they knew these would ensure their neighbours also would build elegant houses, keep them in good repair, and not hurl sewage out of their windows into the street.

The job for planning in new settlements is to set a framework of rules which would entrench virtuous rather than vicious circles from the start. The Government's commitment to massive new housebuilding is – whatever its other problems – a golden opportunity, and the failure to require it to be genuinely sustainable in return for this bonanza for the housebuilding industry is perhaps the Government's crassest missed opportunity on climate change (though the competition is stiff).

Existing settlements are a tougher challenge. However the re-colonisation of central Manchester, Leeds or Clerkenwell in inner London demonstrates that particular groups of people, in particular circumstances, can establish counter-trends. In these cases it was affluent young professionals attracted to a vibrant leisure scene. But this need not be the only group, or the only trigger. I think the Government could make young families of all income levels throng into virtually any unpromising inner city if they promised to keep the schools up to excellent standards, guarantee a place to every child living within walking distance, and not allow any children from outside the area.

Another way to create a 'bubble' of virtuous feedback might be to ban private car traffic from one main corridor into a city and run free public transport at the standard of service expected in most civilised European cities – such as a tram every 5 minutes from early morning to late night. The higher quality of life this would offer might lead residents on other corridors to demand the same.

All this calls for 'systems literate' planning, based on understanding the feedback loops that determine knock-on effects of decisions, and the tipping points that determine which path people go down. It calls for integrated planning of all the relevant variables, including the *quality* of public services (not just their existence) and the costs and prices of (for example) car parking and public transport. It requires a more sophisticated idea of efficiency, sanctioning spectacular 'inefficiencies' in the provision of individual public services for the sake of whole-system goals, for example following Vienna's practice of running empty trams to new settlements before anyone moves in, to support the City Council policy that nobody should have to resort to a car dependent lifestyle because public transport is not working.

Above all, it requires a vigorously interventionist approach, upfront and unapologetic that some collective goals, notably climate security and genuinely sustainable communities, require restrictions of some individual choices, especially ones that increase car and air travel. This is, of course, only a modern manifestation of the ancient political idea of the social contract, where we all accept limitations on individual freedoms in return for collective benefits, such as renouncing individual violence for the sake of public law and order.

Implications for personal travel and freight transport

Tony Grayling (Institute for Public Policy Research)

Major reductions in emissions from transport will be essential to meet or go beyond the Government's target to cut the UK's carbon dioxide (CO₂) emissions by about 60 per cent from their 1990 level by 2050 (DTI 2003). The Government's target is based on the assessment by the Royal Commission on Environmental Pollution (RCEP) of what the UK needs to do as part of a global effort to stabilise the atmospheric concentration of this gas to around 550 parts per million by volume (ppmv), with convergence on equal per capita emission entitlements between countries (RCEP 2000).

At the time of the RCEP report, it was believed that stabilising emissions at this level (about double the pre-industrial concentration) would be likely to limit the average global surface temperature increase to no more than about 2°C above the pre-industrial level. There are serious consequences for people and nature even with that temperature increase but above it the likelihood of severely negative impacts of climate change on human and ecological welfare increases significantly, as does the risk of runaway climate change (Retallack 2005). Hence the EU and others have set a long term goal of limiting the rise temperature to 2°C.

Analysis commissioned by *ippr*, however, suggests that stabilising at 550 ppmv would result in no more than a one in five chance of limiting the increase to 2°C. To have a high chance (four in five) of limiting the increase to 2°C or less requires stabilising all greenhouse gases at about 400 ppmv CO₂ equivalent. To meet this goal, *ippr* recommends that the UK Government aims for a 90 per cent cut in CO₂ emissions from the 1990 level by 2050 (Retallack 2005).

In this context, transport presents a major challenge. It accounted for over a fifth of the UK's domestic carbon dioxide emissions in 2004, of which 95 per cent was road transport (DTI 2005). On current trends, those from domestic transport are forecast to rise as the effects of growth in traffic outweigh the benefits of improvements in fuel efficiency (HM Government 2004). The problem is further compounded by emissions from international shipping and aviation: these are not at present included in the domestic total and are not subject to any regulation.

Already a significant amount, emissions from international flights to and from UK airports are growing fast. The UK should arguably take responsibility for half of these emissions and the other half should be attributed to the countries at the other ends of the flights. On this basis, the UK was responsible for about 12.3 million tonnes of CO₂ emissions from international aviation in 2000, adding about 8 per cent on top of domestic emissions that year, forecast to increase about three-fold to between 32.5 million and 37.1 million tonnes by 2030 (HMT and DfT 2003). The climate change impact of aviation is compounded by other emissions from aircraft at high altitude with the result that the total estimated warming impact is two to four times the effect of CO₂ alone. These effects, however, are more local and ephemeral and are not directly related to CO₂ emissions. They require further research and different solutions which are likely to include regulation and substantial charges for emissions.

In the context of cutting the UK's CO₂ emissions by 60 per cent - or as much as 90 per cent - by 2050, it is clear that transport presents a major challenge. Meeting that challenge requires a speedy transition to low carbon fuels, low carbon vehicles and low carbon journeys, meaning shorter, slower journeys instead of the current trend towards longer, faster journeys, especially by car and plane. As an aside, it could be observed

that people's quality of life and health would be improved if they were able to meet more of their needs close to home on foot, bike or bus.

Highly efficient vehicles, combined with renewable fuels, could also make a big contribution to achieving the scale of emission cuts required from road transport. To illustrate the point with existing technologies, emissions from cars run on ethanol produced from sugar cane in Brazil are up to 80 per cent lower than from petrol cars, including the emissions during fuel production. Hybrid internal combustion-electric engine cars have emissions about one third lower than their combustion only equivalents. Hence the hypothetical hybrid car run on ethanol might produce less than one seventh of the emissions (14 per cent) of a conventional car run on petrol.

Other highly efficient technologies, such as stop-start, are already at hand and there is technical potential for further improvement. Some see hydrogen as the fuel of choice in the long term, with electric vehicles powered by fuel cells run on renewably produced hydrogen, with vehicles run on bioethanol and biodiesel as an intermediate step.

There is no room for complacency given the scale of the challenge. New technologies will not be developed or become commercially viable without constraints on the use of fossil fuels and other supportive public policies. Different renewable fuels produced by different means achieve very different carbon savings and there are questions too requiring satisfactory answers about how much land can be available for growing fuel crops, though co-production with food is an option (e.g. using grain for food and straw for fuel). Fuel crops also have potentially harmful biodiversity impacts that would have to be managed. Producing fuels from woody crops perhaps has the best long-term potential: two studies have suggested that the UK could eventually supply between a quarter and the whole of its transport fuel needs in this way (E4Tech 2003, Eyre et al. 2002).

Hence there are potential solutions on the horizon for road transport. The same cannot yet be said for aviation, while the impact of emissions from international shipping requires urgent assessment. It is wrong to assume, however, that deep reductions in emissions from transport achieved gradually over a period of decades will necessarily mean drastic reductions in the amount of personal travel and freight transport from present levels. That is only one of the possible outcomes, depending on how limits on greenhouse gas emissions result in the development and deployment of new vehicle and fuel technologies, as well as changing behaviour. The imperative is to get the carbon constraints and complementary public policies in place to ensure that, under no circumstances, are safe levels of emissions from the use of fossil fuels exceeded.

References

- DTI (2003) *Our energy future – creating a low carbon economy*
DTI (2005) *Energy Trends*, March 2005
Eyre, Nick; Fergusson, Malcolm and Mills, Richard (2002) *Fuelling road transport: implications for energy policy* Energy Saving Trust, Institute for European Environmental Policy and National Society for Clean Air
E4Tech (2003) *Liquid biofuels and hydrogen from renewable resources in the UK to 2050: a technical analysis* DfT www.dft.gov.uk
HM Government (2004) *Review of the UK Climate Change Programme: Consultation Paper*, DEFRA, December 2004
HMT and DfT (2003) *Aviation and the environment: using economic instruments*
RCEP (2000) *Energy – the changing climate*
Retallack, Simon (2005) *Setting a long-term climate objective: a report for the International Climate Change Taskforce* www.ippr.org

Discussion on Session 1

Using the war metaphor in relation to policy on carbon emissions (1)

At points during the day it was suggested that a 'war on carbon' mentality would be needed before significant carbon cuts could be made. In addition, specific comparisons with the British experience during the World War 2 were made. This use of language drew both strong objections and strong support.

Catherine Mitchell said that war is not a helpful analogy because war is always negative and we need to be sending positive messages. Climate change needs a long-term solution not a quick fight: it's about collaboration, not conflict in order to succeed. Also, the image of war plays into the hands of the nuclear lobby as the war image implies that any low-carbon technology can be justified because of the acute situation we face. Instead, we need to be clear that not all low-carbon technologies are equal and that we should not be advocating nuclear as the only way out of the crisis. Other audience members agreed that a more positive comparison than war is needed. However, **Roger Levett** defended the war metaphor as justified to give climate change the necessary sense of graveness, urgency and need for determined collective action.

Bio-fuels for transport

Tony Grayling had referred to the future range of bio-fuels in his presentation. This led to some debate. **George Monbiot** said that bio-fuels are not the answer. It would take 25 million tonnes of rape on 4m ha to meet current demand. We should be using agricultural land to feed people, not cars, especially as we know that land use is dictated by cost, not human need. In a future economy where fossil fuel is constrained, the rich would prefer to use land for fuel than for food for poor people. Tropicallly-grown bio-fuels are, in theory, more efficient but would bring another catastrophe – even greater disparities between poor and rich, with greater hardship for the majority populations in the South. **Don Mathew** expressed concern that reliance on oil-seed rape for bio-fuels would create more monoculture. **Kevin Anderson** raised the possibility of using the resource of waste from the food chain to create low carbon bio-fuels. In response, **Tony Grayling** said that his projections were based on 'second generation' bio-fuels which could be created from woody material. He stressed that he completely accepted the need for big reductions in carbon emissions, but thought technology could be very helpful in getting us there.

Language and long term goals

David Hirst said we need to be careful at this stage about the words we use. We should talk about emissions reductions trading, as that is the positive 'good' we are dealing with. DTQs (Domestic Tradable Quotas) is not catchy enough - what about climate shares or coupons? **Aubrey Meyer** suggested that we need to target zero carbon emissions by 2060 in the UK under the C&C model. **Tony Grayling** agreed that the UK needs to cut emissions by 90% by 2050. But he held it was wrong to present the issue as a question of sacrifice – this is politically unacceptable and would not get us anywhere.

Other issues

Kevin Anderson said that Tony Grayling's presentation had missed out emissions from marine sources. As marine transport is responsible for emissions equivalent to about 50% of private road transport emissions, this form of transport should be included in the analysis. **Don Mathew** said the planning system is currently led by development (which is a form of economic growth). It should be led by an over-arching plan of how to get where we want to go. He noted that the conference was rather light on representation from local government, yet local authorities will need to help deliver much of what was being debated. He drew attention to the Local Government Association's new vision for a low carbon future. **Trewin Restorick** suggested that we could not afford to wait for the

introduction of carbon rations. We need more regulation now to restrict carbon profligate behaviour.

Proposals for 'first step' actions (1)

Roger Levett suggested that all planning policies and decisions, and development projects, should be tested against the criterion of whether they would increase or decrease net greenhouse gas emissions. Ones that add to net emissions should be referred to a government minister who would only grant permission in exceptional circumstances.

Don Mathew recommended a carbon audit of all government spending and procurement.

Caroline Lucas said that we need to challenge GDP and other measures of well-being. Economic growth has increased over the last 30 years but satisfaction has remained stagnant. As a first step carbon could be adopted as a parallel indicator of well-being, with the long-term aim of it replacing GDP.

Julian Darley referred to Canadian experience in which car co-ops reduced car ownership per person by a large amount (100 cars for 2000 people) but with usage per car only up 15%. **Roger Levett** cautioned that if it is to reduce car use a car club needed a supporting environment, e.g. preferential parking for club cars, , good public transport, and bicycle- and pedestrian-friendly streets to make the alternatives viable for the majority of the population. Without these, a club risks helping non-car-owners to drive more, rather than helping former car-owners to drive less.

David Fleming called for wider understanding of the principle of 'lean thinking' which is widely used in industry. In the classic organisational hierarchy, managers make decisions and order their juniors to do the work to carry out the decision. This models an initiative PUSH. In lean thinking, the initiative comes from the juniors themselves (ie the ones who have to do the work actually decide how best to do it). This equates to an initiative PULL. In industry, it is possible to achieve 80-90% improvements through devolution of decision-making. This model has huge implications for the local/regional government agenda. We need to make strategic choices in a systems-literate way.

SESSION 2: HOUSING AND HEALTH

Implications for housing

Chris Jardine (Environmental Change Institute, University of Oxford)

Significant reductions in carbon dioxide emissions are essential to avert catastrophic climate change. Under the C&C (Contraction & Convergence) framework, the progressively reducing personal carbon allowances will act as a key policy mechanism to achieve the transformation. Considerable improvements in the housing stock will be required, with householders playing their part by seeking the simplest and most cost-effective ways of doing so. These improvements are arguably one of the best ways as, in the short-term, they would entail minimal disruption to lifestyle (transport, holidays etc.).

Two steps have to be taken: first, demand for energy within the home should be reduced as far as possible, then that demand should be met by renewable or low-carbon supply, especially the use of micro-generation within the home. Heat demand can be reduced by thorough insulation of the building (roofs, cavity walls, solid wall, underfloor insulation, double/triple glazing). Electricity demand can be minimised by the use of efficient and appropriately sized appliances. Behavioural changes to introduce careful energy management such as turning off lights and appliances on standby will also help reduce electricity demand.

It is also possible to use low or zero-carbon technologies (LZCs) for generation of heat, electricity, or in the case of CHP both. A wide range of technologies could be utilised. These are summarised in Table 1.

Table 1. Low and zero carbon technologies for use in the home.

	Heat	Heat and electricity	Electricity
Low carbon	Heat pumps	Gas-fired micro-CHP	
Zero carbon	Solar thermal Biomass Geothermal	Biomass in micro-CHP	Solar Photovoltaics Micro-wind

The scale of challenge is vast. A recent study (Boardman et al, 2005) shows that average heat demand will have to reduce from 14,600 to 9,000 kWh per annum, and that each house will have to contain an average of 1.7 of the LZCs outlined in Table 1, if a 60% reduction in carbon dioxide emissions is to be achieved. Under the C&C framework, even more severe cuts are likely to be needed.

The question is: will personal carbon allowances act as sufficient of an incentive to drive such massive uptake of efficiency measures and LZC installations? Many of the measures have very short pay-back times and are therefore already cost-effective. Most insulation measures will rapidly pay for themselves, solar thermal systems will pay back within 15 years (when replacing electric heating), and green electricity can be purchased at virtually the same price as conventional electricity. Newer LZC technologies are more expensive, and not as cost-effective as stand-alone measures. However, when considered as part of a package of lower carbon measures, even these can sometimes be installed at zero overall cost to the householder.

Given that this is the case, why are householders not implementing these measures anyway? The key barriers to implementation are:

- Education: a lack of awareness of the cost-benefits of reducing demand;
- Lack of priority: refurbishment of the house towards a lower carbon needs is not seen as requiring short-term action, and accordingly is not acted upon;
- Up-front costs: the implementation of the measures outlined above does require free capital to be available for the installation before the benefits are apparent.

The introduction of personal carbon allowances (PCAs) would certainly alter this perception. Rationing would certainly raise the importance of low carbon housing and awareness of the measures that could be taken would almost certainly rise. Indeed, personal carbon allowances are likely to be more effective as an impetus to action as a financial incentive.

As in any trading scheme, the price of carbon is determined by the balance between supply and demand. Current trading schemes are operating around the £10/tonne mark – a price which is unlikely to act as a sufficient incentive for installing many LZCs measures. To overcome householders 'threshold of indifference' would require a market very short on supply so that prices were much higher.

There is a further danger in that introduction of PCAs may be very successful in encouraging people to implement measures within the household. Should the population realise that these measures are already cost-effective, sudden and widespread implementation could result in a trading market long on supply, and a subsequent price crash and loss of market liquidity.

In conclusion, PCAs are likely to be an extremely effective tool for encouraging householders to implement energy conserving measures and to instal LZCs, especially those that are already cost-effective. However, their effectiveness as a financial incentive for taking up these measures will be strongly dependent on the price of carbon dioxide emissions on the market. This will be determined by the mix of supply and demand of credits, which in turn will depend on how much emissions have been reduced in the household already, and how much any slack is taken up by use of transport.

References

Boardman, B., Darby, S., Killip, G., Hinnells, M., Jardine, C.N., Palmer, J., Sinden, G., (2005) *40% House*, Environmental Change Institute, University of Oxford, Oxford, Report No. 31.

Implications for health

Robin Stott (Sustainability Advisor to the Mayor of London)

Whilst technological fixes are important they cannot in the foreseeable future completely replace fossil fuels. To deliver the low-carbon society within the regulatory framework of C&C (*Contraction and Convergence*) means that we will have to reduce our energy consumption. The good news is that this process will have major health benefits.

The health of individuals and society at large is a product of the social circumstances in which we live, our networks of relationships with other human beings, and our interactions with our built environment, with nature and so with the planet. Our genetic make-up and health care service are of lesser importance. Global warming is already having an impact on these wider determinants of health.

Unpredictable exposure to extremes of weather are already creating major problems for food growing and water availability. Prospects are dire: for instance, a sea level rise of 1 metre will displace 120 million people, and the female anophelene mosquito responsible for malaria will increase its range, producing an estimated 60 million additional cases of malaria each year. All these will provoke social, economic and demographic dislocation. For our continuing good health we *must* control global warming. Most observers now agree that the only practical way of doing so is to regulate our carbon use by implementing a carbon cap and trade mechanism, as the Global Commons Institute's C&C framework proposal details.

If we look at the epidemiology of death in rich countries, we can immediately understand why. In the UK heart attacks and strokes account for around 300,000 of the 550,000 deaths each year. Many of these deaths occur in young people. Atheroma, the gumming up of arteries, is the pathology which underlies most of these strokes and heart attacks. Atheroma was virtually unknown in traditional, low carbon societies. It has emerged to be the biggest killer in modern industrial societies, ironically societies which have also provoked global warming.

The factors underlying this atheroma epidemic are well-known. Perhaps the most important are lack of exercise and diabetes, which is primarily a disease of the non-exercising obese. High energy, salt and fat rich diets and high blood pressure, a consequence of all these, are also important risk factors. Add to these unemployment, lack of social engagement, social disadvantage, and smoking (which is commonest in marginalised communities), and we get a profile of the circumstances in which atheroma flourishes.

Thus the social changes common to industrial societies have provoked both atheroma and global warming. They are both consequences of the same cause, and will both respond to the same measures, which I outline below.

In the low-carbon, low-energy society, the impacts of which we are discussing, we will necessarily all use more human energy, as was the case in societies before the emergence of atheroma. We will walk, bike and use public transport, activities which will reclaim the streets, enhancing the sense of community and perceptions of safety. We will eat much less meat, moving towards organic, locally-produced mainly vegetarian diets, all of which greatly reduce the present substantial use of fossil fuel required in the production of the food we eat.

We will insulate our homes, and find innovative ways of using renewable energy, with both carbon reducing and job creating benefits. We will move the balance of activity towards leading our lives increasingly within a local environment. These changes will help

create a fitter, slimmer more engaged population and fortunately one which delivers government health targets.

A final health benefit of the C&C regulatory framework is that there will be a transfer of resources from the rich to the poor. An outcome of adhering to the principle of equity is that each individual will get an equal allocation of the capped amount of carbon. Those who don't use their allocation, mainly the poor, will be able to sell it at market rates to those who wish to use more than their allocation, mainly the rich. This redistribution of wealth will reduce disparity, a crucial measure if we really wish to improve public health. Given this market mechanism, it will be in everyone's interest to minimise the amount of carbon we use. Just as all of us strive to live within our financial means, we will strive to live within our carbon means, with the evident financial benefit this brings. In essence the C&C framework moves society toward the social environmental and economic circumstances which promote good health.

The health service itself will also be beneficially touched by C&C. At present, around 90% of health interventions take place locally. In line with the government's health strategy, and enabled by the information revolution, this high percentage is rising. Low energy societies will accelerate this trend to locally-based health provision. Finally, health facilities can be exemplars for many low-carbon initiatives, as shown in the London regions initiative '*Building for health*'.

To summarise, a public health initiative guided and regulated by the C&C framework will help us meet government targets for personal health. In addition, this conceptually simple idea will help mitigate the two major problems undermining global health - global warming and the disparity of resources between the materially rich and the materially poor. Everyone is interested in health. All of us must be delighted that we have an elegant solution to so many of our health problems. Let's move to implement it as soon as possible. Let's use C&C as a short-hand for good public health.

Discussion on Session 2

Green electricity

There was a detailed debate about the value of consumer purchasing of green electricity and alternative mechanisms to encourage electricity generation from renewable sources.

Keith Allott said that green tariffs do little to help the 'clean-ness' of the system as a whole. Green electricity simply creates the illusion that something positive is happening. **Bill Bordass** reported that green electricity tariffs have recently been abandoned in Sweden. However, **Chris Jardine** said that the amount of 'green' electricity sold contributes to the total mix of generation sources with the result that overall it does have a positive effect. He also described several barriers to accounting for micro-renewables, which make it difficult to encourage them via the current system. **Catherine Mitchell** suggested that we need an additional mechanism to encourage micro-generation, eg feed-in tariff whereby each unit of green electricity is bought at a premium, thereby rewarding clean energy generation (the current grant system in UK only provides incentives for capital outlay, not an ongoing reward for energy generated and carbon). These issues are important to achieve a large scale take-up of micro-generation. **Chris Jardine** responded that feed-in tariffs are a good idea and could be complementary to PCAs. Finally, **Adam Poole** said that Windsave micro-wind turbine manufacturers plan to 'collect' the highly dispersed units of energy generated from all the small turbines they sell and then to collate the total for ROCs so that the owners of these turbines receive a bigger dividend from this system than they do at present and to incentivise more people to buy turbines in the first place.

The role of communities and cities

Trewin Restorick highlighted his Global Action Plan which pioneered an approach based on neighbourhood discussion and shared learning. **Colin Challen** suggested that greater attention should be paid to the community-owned renewables sector as this generates income for (marginalised) communities as well as energy. **Roger Read** said we also need to look at this at the city/region level. Many cities across Europe are signing up to deep cuts in carbon emissions but generally the city/region level of government doesn't exist in a form that can achieve these aims.

Localisation of the economy

George Monbiot put forward the case for locating manufacturing where the primary resources are to be found, rather than having, say, aluminium smelters dotted around the globe and lots of freight fuel spent on transporting bauxite. We need the lowest carbon cost solutions. **Julian Darley** supported the call for a need to re-localise the economy and noted that the big gap in infrastructure is local manufacturing. **Roger Levett** responded that manufacturing is more complex than a localisation issue. We may wish for conditions in sweatshops to be improved, but the people who have the jobs want the income. We need to be discerning about what gets manufactured where.

Contraction and convergence and personal carbon allowances

Several speakers emphasised the links between C&C (Contraction and Convergence) and personal carbon rations. **Aubrey Meyer** noted that both are constitutionally based on equal rights to the global commons. **Robin Stott** said that one of the beauties of the C&C framework is that it is a mechanism for allocation of the global commons from rich to poor. Health benefits will only come if we use less non-human energy. **Aubrey Meyer** argued that C&C is first and foremost a logical proposition. The politics of the future could easily be a bloody tribal war. All world citizens have a stake in ensuring that climate change is dealt with adequately.

Other topics

Walt Patterson made the powerful point that we need to use less fossil energy, not less energy per se. Asset accountancy and other financial policies are relevant to changing the system. Half the price of a unit of electricity is arbitrary because of the relationship between regulator and suppliers. **Derek Osborn** noted the conflicting units that were being used in the discussion. In housing, the unit is the household, but PCAs are based on an allocation on an individual basis. **Another audience member** said that PCAs allow the poor to benefit financially from climate change but the fuel poor continue to suffer. What is needed first of all is a better understanding of the many connections between carbon emissions, poverty and health. **Kevin Anderson** reminded the audience of the role of behaviour in achieving the necessary cuts in carbon. **Chris Jardine** suggested that the difference between the EU Emissions Trading Scheme and the idea of PCAs lies in the different agents involved. With PCAs, responsibility for carbon lies with the end-user so the rewards (and disbenefits) accrue directly to the user of goods and services. **Mayer Hillman** referred to the fact that there would be an additional benefit from carbon rationing. The reduction in the gap between rich and poor that it will bring will improve public health as research has shown that longevity is lower in countries with a wider distribution of incomes. Reduce the income gap and you improve health.

SESSION 3: THE ECONOMY, EMPLOYMENT AND POLITICS

Implications for the economy and employment

Caroline Lucas (Green Party MEP for the SE of England Region)

During this session, my focus is on the economy and employment – looking at which businesses are likely to grow and which to shrink in a low carbon world; examining the implications of this for education and training; looking at the implications for international trade, and exploring the extent to which GDP is invalidated as the measure of economic progress.

The economy

I have to say that, personally, the area that fascinates me the most is the last one - the way in which the issue of carbon rationing brings right back to the top of the agenda the whole debate, which has been raging for at least 30 years, about limits to economic growth. The flaws and limitations of using GDP and economic growth as yardsticks for well-being have been recognised for many years. That makes it all the more extraordinary that economic policy still seems to be designed as though maximising GDP were its sole objective.

Presumably, one of the explanations for this is simply that politically it is very difficult to admit that growth, with its almost religious connotations of ultimate goodness, must be limited. I wish there were time to get into all the debates about the extent to which improving the efficiency of resource use can help, and the issues around decoupling economic growth from fossil fuel consumption – but as there isn't time to do so here, suffice to say that these debates are given added urgency and clarity in the context of carbon rationing. I think carbon rationing brings added focus to an increasing recognition that it is ultimately impossible for the world economy to grow its way out of poverty and environmental degradation. In the eloquent words of Herman Day, writing well over 10 years ago:

“The term sustainable growth when applied to the economy is a bad oxymoron – self-contradictory as prose and unevocative as poetry.”

One of the key questions this raises is about poverty eradication in developing countries. This will certainly require more growth, but how do we in richer countries adapt to ensure that can happen in a technologically positive way? What does seem certain is that a low carbon future will also be a low GDP future – in terms of materials and energy throughput. So we had better hurry up and develop alternative indicators which in any case more accurately express well-being, and develop policies based on ideas like the Index for Sustainable Economic Welfare, or Gross Domestic Happiness modifying them to include a measure of the carbon intensity of our economies.

International trade

Since international freight transport accounts for one of the fastest growing sources of greenhouse gas emissions, it is clear that a low carbon future will be one in which there is far less international trade – we can argue about how much less but it is going to be less – and in which the relocalisation of our economies is the new goal.

Over a period of time, there will have to be a transition away from dependence on international export markets, towards the provision of as many goods and services as feasible and appropriate from national and local sources. And we should also bear in mind that although cutting back on international trade may come across as heretical, it is not as draconian as it might sound – around 50% of all international trade involves the

simultaneous import and export of roughly the same product between the same countries. I'm reminded of the words of Herman Daly again, who was looking at the huge amounts of unnecessary international freight transport – biscuits going from the Netherlands to the United States for example, and US cookies coming back the other way, and memorably remarked – 'wouldn't it be so much easier simply to exchange recipes?'

To look at a few facts about the food trade, as a case study. Food actually accounts for the largest proportion of international freight – 49% by commodity – and it is increasingly inefficient:

When transporting food long distances, we put in more energy (in the form of fossil fuels) than we get out (in the form of food calories). For every calorie of iceberg lettuce flown in from Los Angeles, we use 127 calories of fuel.

Even with organic food, it's still the case that one sample basket of imported organic produce could release as much CO₂ into the atmosphere as an average four-bedroom household does through cooking meals for 8 months.

And, rather than importing what they can't produce themselves, many countries appear to be simply "swapping food". In 1997, the UK imported 126 million litres of milk and exported 270 million litres. It is the same story for a number of meat products as well.

The impact of less international trade on developing countries is one that needs to be examined. Fewer mangle-tout from Zambia perhaps, but there is at least some evidence that supporting countries to rebuild their own economies and communities, rather than skewing their markets for exports, or having these economies undermined by cheap imports, is a more effective development policy. Take the case of one of the poorest countries: Haiti was bulldozed by the IMF into liberalising its rice markets with the result that it was flooded with cheap US imports, local production collapsed, and thousands of livelihoods were destroyed. Ten years ago, it was self-sufficient in rice. Today it spends half its export earnings importing rice from the US.

Evidence from UNCTAD also shows that free trade and open markets may not necessarily be the best way to eradicate poverty. If that is the case, we need to urgently rethink development policy with its emphasis on export-led growth and ensure that there is a significant transfer of resources to the South to support their development. Another danger is that if carbon rationing is introduced in one country at a time, and if industrial goods are covered, then industries in those countries which are not compliant will have at least a short-term competitive advantage over those which are. One way of addressing this could be to levy border tax adjustments on imports.

Employment

What are the implications for job generation in the UK?

A low carbon future will inevitably create winners and losers. And although there is evidence to suggest that winners will outnumber losers that is not much comfort to the latter. It is clear that more people will be involved in production and manufacturing in the UK, rather than in the business of imports and exports. Some jobs – like those in long-distance trucking – simply won't be necessary any more. We therefore need to focus on the importance of transitional policies, including those supporting retraining and wider take-up of appropriate skills. The main barrier is lack of policy certainty and therefore clear mandatory targets on energy efficiency are needed to encourage industry to invest in new products and research. Carbon rationing is likely to prompt this.

Energy conservation and renewables

Let's have a quick snapshot of a range of sectors – starting with the energy sector itself. An Association for the Conservation of Energy study into the employment impacts of 44 energy efficiency investment programmes in 9 EU countries showed that, with rare

exceptions, overall employment levels were increased. A joint research project into sustainable job creation in the EU carried out by a range of trade unions and environmental organisations in 1999 concluded that "every single euro invested in energy conservation (and renewables) creates more employment than one euro invested in the conventional energy supply." The latest update on the progress of the Home Energy Conservation Act estimates that between 1999 and 2001, over 12,000 jobs were sustained in installation work.

Increases in employment from investment in renewables look similarly positive. The European Commission estimates that a doubling of electricity generated from renewable sources from 6% to 12% could create between 500,000 to 800,000 new jobs in the EU. It has been estimated that raising the contribution of offshore wind alone to 30% would result in a net increase of UK jobs equivalent to 76,000 people working full-time.

Recycling/resource use

Compared to unsustainable waste disposal options of land-filling or incineration, recycling also presents many more job opportunities. Incinerating 10,000 tons of waste creates one job; land-filling the same amount creates six jobs, while recycling the same quantity creates 36 jobs. A report by the think-tank Demos suggested that an intensive recycling programme in Britain would result in 15,000 jobs in collection and sorting, and between 25,000 and 40,000 jobs in manufacturing and processing.

Transport

Some years ago, Friends of the Earth made some calculations on the impact on jobs of a more sustainable transport policy. Based on fairly modest assumptions of a fall in traffic levels of 10% between 1990 and 2010, and using targets published in the Royal Commission on Environmental Pollution's Eighteenth report "Transport and the Environment" to forecast future use of trains, buses and bicycles, it concluded that by 2010 green policies to promote public transport, cycling and walking could lead to the creation of 130,000 new jobs - more than offsetting the loss of around 43,000 jobs in the motor industry as a result of decreasing car use. Furthermore, if measures were taken to encourage the use of cleaner, more efficient vehicles and leasing rather than car ownership, another 35,000 jobs could be created. A report highlighted by the Union International des Transports Publics notes that public transport generates twice as many jobs per passenger kilometre as the car.

Tourism

Clearly, tourism which involves aviation – the fastest growing source of greenhouse gas emissions – will account for a much smaller sector in the world of carbon rationing. Contrary to the myths, tourism via aviation is a net drain on the UK balance of payments because far more tourist money flies out of the UK than flies in - £17.7 billion a year compared to £9.1 billion. That's an £8.6 billion annual drain on the UK balance of payments due to air tourism alone. As cheap subsidised flights tempt far more Britons abroad than are persuaded to visit the UK, this deficit has increased. Carbon rationing is likely to lead to more holidays being taken within the UK, or at least to destinations more easily accessible by road, rail or sea. In other words, domestic tourism will gain but with corresponding losses for international tourism.

Agriculture

Studies show that employment is on average 10% to 30% higher on organic farms than on conventional ones. Given that 70% of UK organic produce is imported and the UK remains one of the fastest growing organic markets in Europe, with demand growing at 33% a year, there are considerable opportunities for maximising job opportunities from developing our organic agriculture sector. Sustain, which has been spearheading the Organic Targets Campaign, calculates that, using a conservative estimate of 10% for the increase in jobs on organic farms, an additional 27% of land used in this way (taking us to the target of 30%) would yield an additional 16,600 jobs in the UK, of which over

8000 would be regular and full time. The dominance of the supermarkets could also be expected to end, with more local sourcing and local distribution, more economic players in the sector, and the chance for British farmers to get a decent return on their produce without being undercut by cheap imports.

Training

Developing the skills to design and build sustainable communities requires a radical change to the setting of education, employment and social inclusion targets linked to funding. And it's urgent, because the academic and professional community has already voiced serious concern that the UK will not have a sufficient workforce to meet its existing EU carbon reduction obligation or national targets in legislation like the Energy White Paper. There are simply not enough qualified people - in particular in the fields of engineering, building services, construction and utilities - to build and maintain sustainable communities. A 2003 report from the Electricity Training Association (ETA), for example, predicted that the UK would need a three-fold increase in demand for electrical engineers alone if the UK is to meet the 10% renewable energy target by 2010.

One of the problems is that the Government has separate policies on social exclusion, employment, training, and environment. Effective long-term sustainable development requires integrating all four areas. Regional and national frameworks should be developed to facilitate the greening of training and apprenticeship initiatives. And the Government should lead by example: for example, it continues to run an unsustainable procurement policy despite having national waste and energy targets. Companies, training and professional bodies should be required to integrate sustainability into their strategies and daily practice, in much the same way as Equal Opportunities.

Key questions for debate

Growth versus development – what are the implications of a low carbon future for growth in the developing world?

What is optimum area in which to introduce carbon rationing – UK, EU, OECD? And what are the trade and competitiveness implications?

Policies for transition – people in unsustainable jobs shifting to more sustainable employment, and the need for conversion technologies. How are these workers to be phased out of current employment and into sustainable employment and what is the role for trade unions in delivering this transition?

Some political observations

George Monbiot (Author and Guardian columnist)

We've now seen two leaked versions of the G8's draft agreement on climate change. The first one was terrible. The second one is worse. The G8 leaders seem prepared to wage war on everything, except on preventing the destruction of the biosphere.

In the absence of government action, it is always tempting to go private: to opt for consumer democracy. This was what a man I admire – Charles Secrett, the former director of *Friends of the Earth* – was urging in *the Independent* a couple of days ago. "We need to be aware of the consequences of our own actions and not rely on the Government to legislate and save us," he wrote. "It would be beneficial for the Government to introduce stringent pollution taxes. But how far do we want legislation to go? What sort of society will it be when government has to legislate for everything we do to avoid terrible pollution and the catastrophic effects of climate change, trampling on

our civil liberties in the process? We as individuals need to act to prevent such a green Orwellian nightmare.”

I understand what he is saying, but I think he is wrong. We rely on the government for the simple reason that it isn't going to happen any other way. Why? Because, with the glowing exception of Mayer Hillman, we are a bunch of hypocrites.

Let me give you some examples. In an interview with *the Guardian* recently, Chris Martin, the lead singer of *Coldplay* and all-round good guy, spoke of his concerns about climate change. On his new album there's "an intense, angry track encouraging people to make the right decisions about how they live their lives and how they treat the planet." A few paragraphs on, he revealed that he was about to "fly by private jet to Palm Springs ... The band can now afford to fly wherever possible". Neither Martin nor the interviewer appeared to recognise the contradiction.

At the beginning of his "*Organic Bible*", Bob Flowerdew explains that organic gardening means minimising "any bad effects we may have on the environment." He goes on to boast that "when most people are only planting their [new potatoes] on Good Friday ... I am eating mine." How? By growing them in a heated greenhouse.

We had a wonderful green meal today, and I commend the caterers, not least because this is the first eco-conference I've attended where neither tuna nor prawn sandwiches were served. But did we have to have American blueberries, during our own raspberry season? Robin Stott this morning told us about the bicycle trip he took through Africa. But how did he get there?

I don't excuse myself: the temptation to take advantage of our staggeringly cheap sources of fossil fuel is overwhelming for all of us, except Mayer. Charles Secrett finishes his article with these words. "We are already running out of time and common sense tells us to start today. It is lazy and irresponsible to leave a machine on standby, so switch it off." I applaud the intention, but this is as pious and impotent a statement as the remonstrances of the temperance movement.

There are several problems with consumer democracy – some people have more votes than others and that it can only pull - it can't push. But the overwhelming one is this: it doesn't work.

We will do anything but change our habits voluntarily. The urge to seize and use as much energy as possible long pre-dates human civilization. It reflects the biological need to keep entropy at bay. We will exercise it until we are stopped. Stopping us will, I am afraid, require some restraint of our civil liberties. It involves restraining, for example, the freedom to travel wherever we like, whenever we like, by whatever means we choose. I don't know whether such curtailment amounts to a green Orwellian nightmare. I do know that it is the only means by which climate change will be adequately addressed.

The problem, of course, is that no one ever rioted for austerity. People take to the streets because they want more, not less. But I think that will change. I think it will change as the extraordinary moral challenge of climate change begins to bite. I think it will change as people begin, for the first time in history, to understand that it is better to curse the darkness than to burn your house down.

But for this to happen, we must turn climate change into the biggest political issue in the industrialised world. For that we need one thing above all other: enemies. The campaigns which have succeeded over the past few years – such as the fight against the Tory road building programme and the campaign against GM crops – worked because we knew who the enemy was. A set of corporate and political interests were imposing something on us

we didn't want. By forcing those players to fight in the open, we used the superior power of democracy to defeat their oligarchic control of policy.

Climate change is more difficult, as all of us are participants. But our consumption is being promoted and enhanced by a clearly defined set of interests. By articulating precise demands and targeting particular industries, we will force them to fight back, and therefore to take a publicly visible position. It's only then that the campaign takes off. While the false consensus – that government, industry and citizens are all working together to solve the problem – persists, the public appetite for confrontation will continually be sapped, and the business of destroying the biosphere will go on as usual. The oil companies can dialogue the whole world to death. A false consensus is precisely what they have sought to engineer.

We must turn this into a fight in which governments are forced to take sides: in which they recognise that they cannot simultaneously suck up to Exxon and ingratiate themselves with the public. As more and more people understand the consequences of climate change, a straight fight is something that Exxon cannot win. It's about time we ditched consumer democracy and invested instead in plain democracy.

Discussion on Session 3

Peak Oil (1)

The importance of the issue of 'peak oil' was cited as was its relationship with the development of policy on combating climate change. **David Fleming** suggested that oil and gas depletion is actually more urgent than climate change (certainly for the mainstream). The peak is forecast for 2007. We need 20 years to re-cast the economy but we are on track to hit the wall before then. Therefore, he believed that oil rationing will come in before carbon rationing. **Richard Douthwaite** said that the Wuppertal Institute claims that oil and gas depletion will solve climate change through a 3% annual reduction in fuel consumption. But it is not a solution that would be at all equitable – only the rich could afford the fuel. In his view, the question of money supply is at the heart of the problem. This needs reform, but he thought it was probably not a debate for the conference. **George Monbiot** asserted that the oil peak won't solve the carbon emissions problem on its own. We should be careful about welcoming oil price rises as the solution: a \$10 rise in oil price will lead to 0.5% less growth in the UK – but more in poorer countries. In addition, talk of oil/gas depletion ignores the fact abundant coal still exists. There is an estimated 3 trillion tonnes of coal with potential for partial underground combustion – a technique for exploiting otherwise uneconomic reserves. Also, methane hydrates in the tundra are another new source of fossil fuel, and methane is a more potent greenhouse gas than carbon dioxide. Should carbon rationing extend to other GHGs, such as methane? Finally, **Caroline Lucas** considered that it may be beneficial to explore these issues of oil/gas peak to find potential synchronicity with the carbon rationing agenda, although she recognised that George Monbiot's arguments were compelling.

Choice (1)

Catherine Mitchell said that the common thread is giving people choice, both at a local level and an international level. **Roger Levett** cautioned that our current choices are leading us in the wrong direction. We need collective choice as well as individual choice, and our future quality of life depends on making collective decisions that restrict certain individual choices. **George Monbiot** suggested we need to restrict choices that destroy the future of humanity. But this is not about making everyone wear a Mao suit. At the moment, environmentalists are failing to make climate change the central issue that it needs to be. Look at the level of opposition to climate change (ie deniers of climate

change). The fact that this opposition is so pathetic is an indication of how we are failing to win the argument.

Using the metaphor of a 'war on carbon' (2)

An audience member objected to George Monbiot's language – too much fixation on conflict, war, and on 'Us & Them'. People need freedom to choose and to live more richly – there is no precedent for the problem of climate change and no previous paradigm that we can rely on. Promoting conflict will not help. **Caroline Lucas** commented that she did not like the war rhetoric, but it does engender a sense of urgency. We need a consistent communications strategy and we need to expose the contradictions that abound – eg Blair claiming that climate change is the most important political issue but a tax on aviation fuel is politically unfeasible.

SESSION 4: WHERE DO WE GO FROM HERE?

Mayer Hillman opened discussion under this heading highlighting a number of themes he considered to be particularly important:

The runaway effect of climate change is already with us. Precious time is running out as we go on looking for an alternative to C&C as a framework for action. There isn't one. And let's recognise the other highly significant benefits that will come in train with carbon rationing – considerably improved health and social justice.

Doing better is not enough – as a matter of urgency, we need to get down to an annual personal ration of just over one tonne of carbon dioxide per year.

We do not have the right to exceed our ration, and there is no question of 'choice' in this regard. Even we, the experts on this issue, do not seem prepared to reduce our carbon emissions sufficiently. It needs government action. We need to be telling government to get off the fence.

It is incumbent upon us – those who have a reasonable claim to understand the consequences of different policy options – to educate all people to take climate change seriously and that C&C is the answer to the problem. We have a higher responsibility to future generations than at any time in human history. In his view, carbon rationing is closer than anyone realises: Economic growth in the way it is currently measured can have no future in a world heavily constrained by the need to severely limit greenhouse gas emissions is on the way out as the framework for social/political action.

Tina Fawcett suggested that a clear research agenda is among the many actions that are needed. One activity that is already being carried out is to pilot a survey of UK citizens so that we understand better the spread of carbon emissions from different lifestyles. Ideally, this pilot will lead to a bigger survey with a much bigger sample.

Discussion on Session 4

Robin Stott said he has been part of a group of people who have been analysing their carbon emissions over several years. But even though they are reasonably committed, well-educated, they have found it hard to limit their emissions. In his view, legislation is the only answer.

Peak oil (2)

Julian Darley reiterated the point that peak oil is the urgent issue and the one likely to make people take note. **Aubrey Meyer** agreed that we should link climate change to oil depletion. **Richard Douthwaite** said Mayer Hillman was too optimistic about the pace of change that can be expected. Oil depletion may drive a fall in consumption but we need to find an equitable way to achieve the ends we seek, such as setting up a consortium of fossil fuel importers to match and counter-balance OPEC. Such a system could set a protocol for managing oil depletion at a pre-set price. Note that too high a price could lead to extreme uncertainty, which could in turn lead to price collapse. It is therefore in the interests of producers as well as consumers to manage the market and avoid this uncertainty.

Choice (2)

Roger Levett considered that different kinds of system require different kinds of intervention. Choice is almost always taken to mean consumer choice in current debates. But that many sustainability issues can only be tackled through collective choice must be taken into account, even though it may lead to restricting individual choice. **Richard Starkey** suggested that the question of regulation versus choice is a non-debate. We need to set a cap on emissions with people then free to exercise choice within it.

Research agenda

The following topics were suggested in the final discussion session.

- A good area for research would be at the city-region level – how can such a scale of community achieve an 80% cut in its emissions? (**Roger Read**)
- Identify what legislation needs to be put in place to rule out what is unacceptable in carbon terms (**Trewin Restorick**).
- GAP has an Eco-teams database, where households from all over the country are in-putting data on actual energy use and degree days. He offered to make these data available for research (**Trewin Restorick**).
- What would the price of carbon have to be to make people change their habits?
- Is there a good link to be made between 'peak oil' and climate change? It was suggested the peak oil issue has spurred people into action in North America.
- A 'systems literate' approach is needed, looking at the way decisions and changes in one policy area affect others in a dynamic way, and trying to identify the 'tipping points' that determine whether people choose sustainable or unsustainable options. (**Roger Levett**).
- Three key areas for further research can be identified: DTQs and EU Emissions Trading System; DTQs and IT; and DTQs and fuel poverty (**Richard Starkey**).
- How far will rationing itself do the trick, or do we still need to reinforce its effectiveness with, for instance building regulations? (**Derek Osborn**).
- A clearer programme of what we want the government to do on carbon allowances, and the pace of change that this entails needs to be identified (**Derek Osborn**).

Final inspiring thought

Bill Bordass noted that the UK had led the world into the carbon era through the industrial revolution, and that we are responsible for 15% of global historic emissions. In these circumstances, it is highly appropriate for the UK to lead the world out of the climate change problem.

SUMMING UP

Derek Osborn (Commissioner for the Sustainable Development Commission)

The urgency of tackling the climate change issue has been dramatically illustrated and reinforced during the day. The graphs illustrating the impacts of climate change bearing down on us look like a global tsunami – we know we have very little time to avoid disaster. The 60% reduction target by 2050 seems ambitious but is almost certainly not enough.

So far the pace of change in public awareness, in Government policy and in actual behaviour is depressingly slow. Society as a whole is still heading in the wrong direction.

For our final goal we need to keep emphasising the logic and the moral imperative of Contract and Converge. There is no defensible alternative. This principle provides a rationale for the allocation of long term goals and tradable targets between different

countries. Taken to the individual level it provides the rationale for allocating PCAs (personal carbon allowances), domestic tradable quotas or rations to individuals.

The day has illustrated that living with a system of PCAs set at levels that are substantially below current average UK levels of consumption will pose big challenges and will require big changes. Some of the changes are easier to envisage than others, and some are likely to be more easily acceptable than others. But it is important not to be overwhelmed either by the scale of the problem or the challenge. As well as problems, the day has revealed many exciting opportunities for making the changes needed to contribute to the well-being of society as a whole.

Major changes to our housing stock to reduce its energy consumption are not difficult to imagine, and only lack the necessary incentives and requirements to make them happen. Once achieved we would all benefit, and would wonder why we had not made it happen earlier.

Changes to personal transport behaviour are harder to think through, and the implied limitations to personal transport choices are harder to conceive as being popular. There will need to be a major effort to identify and promote the health and social benefits of relying less on motor cars and aeroplanes

How far could the introduction of tradable PCAs itself drive all the other changes that are needed by setting such a high price on acquiring extra PCAs from the market that everyone will have the strongest incentive to secure greater energy efficiency and drive down their own carbon consumption? Or will we need to continue on parallel tracks with many other detailed regulatory and fiscal interventions to reduce carbon consumption?

The tendency of the discussion was to favour 'belt and braces' and to pursue all possible lines for policy intervention. But it might be worth considering further whether PCAs would be such a powerful tool that they could actually be coupled with some deregulatory initiatives on particular topics so as to let the market in PCAs do the work of securing many of the efficiency gains needed. If there were effective PCAs would we, for example, need ever tighter building regulations as well? And tightening standards on appliances, vehicles etc?

Or is it the other way round? Do we need to make much more progress on improving standards of buildings, vehicles, appliances etc before PCAs could be politically acceptable? How does the timing of it all need to fit together?

Tony Blair is to be congratulated for putting climate change on the international political agenda, but we need to get the UK into a position where it leads in actions to mitigate climate change, not just in rhetoric. Some have urged a comparison of our situation with that at the start of World War II when there was a strong collective sense of crisis and solidarity which made the introduction of rationing immediately acceptable and even popular. Others have found it less helpful to evoke a wartime comparison with its implication of an enemy to be identified and overcome. Do we need to fabricate enemies?

All agree however that leadership and solidarity are key. What is required at the highest political level is a sense of urgency that translates into meaningful action. Perhaps there should be some kind of Governmental 'overlord' for climate change driving a co-ordinated programme through every Department and giving serious political attention to the possibility of introducing PCAs. At the same time we need to reinforce the sense that we are all in this together and can only get out through concerted action and equitable sharing of the tasks.

Finally the summary message from today's conference is very Churchillian: ACTION THIS DAY.

AFTERWORD

Mayer Hillman (Policy Studies Institute)

In his summing up of this Conference, Derek Osborn refers to the imperative of achieving reductions in carbon dioxide emissions, substantially lower than their current levels, and the “big changes” that this will entail, but stresses the importance of not being “overwhelmed” by the scale of the challenges posed. However, judging by the evidence, rather than presiding over a steady and significant fall in emissions over the last 15 years, governments have found this intention to be beyond their capabilities, delivering only a very modest reduction. And much of this has nothing to do with policy on climate change but is attributable to the loss of the country’s manufacturing base and the so-called ‘dash for gas’ in electricity generation.

For whatever reason, failure can be noted in several key respects, many of them referred to in our introductory remarks at the start of the Conference:

the urgency with which solutions must be found has not been emphasised nor have the massive changes in perceptions been conveyed to the public of what life is likely to be in a severely carbon-constrained world;

the targets set for carbon dioxide reductions bear little resemblance to reality if catastrophic ecological outcomes are to be avoided. Moreover, it is all too apparent, that to meet a realistic target, major behavioural change is required as well as the widespread take-up of the cost-effective measures that technology has made available and is likely to make in the near future;

even the spurious figures employed to measure progress towards achieving the limited targets exclude the significant amount of fossil fuels used in air and maritime transport;

the conventional view is still held that economic growth and protection of the global environment can be made compatible objectives in face of overwhelming evidence that this growth is too closely coupled to greenhouse gas emissions for this to be possible within the limited window of opportunity before the predicted runaway effect of global warming is irreversibly set in train.

Given the conclusions of the recent Exeter ‘Summit’ of Climate Scientists about the very few years left before the concentration of emissions rises to a level above which preventive measures can no longer be brought into effective play, and the recent statement by the Joint Science Academies around the world of the increasingly serious threat of climate change, it is very difficult to account for the insufficiency of present policies and the awesome implications of this for the future health and well-being of the planet and its inhabitants.

The likely explanations for the failure are:

fearing the electoral consequences of effective action, particularly as past errors of judgement on this crucial topic will then have to be admitted;

having to come to terms with the phenomenal changes that must be made in personal behaviour and in commercial and industrial practices that are in any way energy-intensive;

preferring the ‘cross-fingered’ route of education combined with persuasion, mild legislative changes and financial incentives so that people do what is needed on a voluntary basis;

lacking the political will to take the interventionist approach, as articulated by Roger Levett at the Conference, in order to more deliberately encourage 'systems-literate' planning and to promote sufficiently eco-friendly lifestyles and industrial practices, and by Caroline Lucas in making the case for integrating the concept of sustainability into policies on social exclusion, employment, training and the environment;

pandering to an electorate which government has failed to educate and, as a consequence, cannot be expected to support the adoption of restrictive policies which will result in narrowing rather than widening its future choices. As George Monbiot said, 'no one every rioted for austerity'!;

coming to terms with the unpalatable evidence of a near-universal collective amnesia on the subject and of claims that preventing people from choosing where they live and work and where they take their holidays can be interpreted as an unacceptable restriction on their civil liberties.

Even politicians, civil servants, people in business and other members of the general public well informed of the horrendous outcome of maintaining energy-intensive lifestyles entailing a grossly unfair share of the planet's safe level of greenhouse gas emissions are not in practice prepared to voluntarily forego their energy profligacy.

Against this background, the consequence of both the government's lack of resolution in facing up to its responsibility and its failure to educate the public about the gravity of the situation have inevitably led to its pursuit of short-term remedies. The attractions of this strategy are all too obvious. Though obviously inadequate, they can be shown to result in *some* measure of progress.

Confidence in this form of 'muddling along' is strengthened by highlighting the wealth of 'escape routes', such as the means set out by Christian Jardine showing that a 60% reduction in carbon emissions from the building stock could be achieved by 2050. And then there are the prospects that developments in science and technology tantalisingly offer and that, if successful, would then make it possible to avoid draconian measures having to be taken. As Tony Grayling pointed out, solutions for road transport are on the horizon though we cannot be assured that, for that reason they will necessarily materialise. Moreover, he drew attention to the fact that no substantive solution is in prospect for the fastest growing sphere of the transport sector, aviation. Allied to this lies the problem that, in a democracy, governments find it almost impossible to adopt policies that run the distinct risk of opposition parties with less demanding proposals replacing it at the next election.

As its point of departure, this Conference was deliberately aimed at 'jumping the gun', drawing on the conclusions of our book *How we can save the planet* that only the Global Commons Institute's framework proposal of Contraction & Convergence and the early introduction of personal carbon rationing have an assured prospect of achieving the challenging scale of reduction in emissions. No one has been able to put forward a realistic alternative that stands up to equivalent scrutiny.

We sought to open debate on the implications for six sectors of the economy and society of what we consider to be the inevitability of government taking this course of action. It was very apparent from both the introductions to the sessions dealing with these sectors and the following discussions that wide benefits will come in the wake of adopting this strategy. Not least of these will be that people who are not contributing to the degradation of the planet's climate system will be the recipients of revenue arising from the sale of their unused carbon entitlements to those still disengaging from their energy-profligate activities. The entitlements will mean that there is no longer 'aid' or 'benefits'

being 'generously' donated to the 'deserving' poor. This is equal shares for all within the discipline of a global limit. And this structured synergy between social justice, market forces and human survival makes the 'price of carbon' equal to the price of survival. Moreover, as Robin Stott argued, the outcome of rationing will be to reverse the process of a widening of the gap between the materially rich and poor which has been shown to be so injurious to public health.

That is not to say that the adoption of carbon rationing will not result in any losers. Activities which are highly energy-intensive, such as motor manufacturing and use, international tourism and world-embracing events such as the Olympics, can have no future in a world that must urgently adopt carbon-thrifty lifestyles. That represents a small price to pay to prevent inevitable environmental degradation from climate change!

Few can doubt that progress cannot be made against a background in which political parties vie with each other for political support. But there are encouraging precedents for anticipating a process by which the political parties bury the hatchet on critical issues – there is every reason to believe that climate change is par excellence the most appropriate one on which they can together form an alliance. Already, most of the political parties have publicly lent their support to the all-embracing Contraction & Convergence proposal. The fact that the day before the Conference the inaugural meeting of the All-Party Parliamentary Climate Change Group, with Colin Challen as its Chair, was packed, suggests that a political consensus could soon be reached in favour of the introduction of a steadily annually reducing carbon ration.

The urgency with which this needs to be undertaken was indeed illustrated by the reference made by Colin Challen to the stages leading to war and his assertion that whilst we are at present in the appeasement phase, it needs to be recognised that we are the aggressors - as well as running the very real risk of being potential victims. This is of the essence: without resolute political action now, we will be handing over the dying planet to the next generation.

July 2005

Biographical notes

Brenda Boardman

Programme Leader, Lower Carbon Futures group at the Environmental Change Institute, University of Oxford, and Co-Director of the UK Energy Research Centre. She specialises in the efficient use of energy in the UK domestic sector, with an emphasis on energy policy in relation to climate change and equity issues. She considers the economic, social and technical aspects of the subject and her work has a strong policy emphasis. She has been a member of the DTI's Energy Advisory Panel and is widely viewed as one of the most experienced in her field. She was awarded an MBE in 1998 for her work on energy issues.

Colin Challen

Labour MP for Morley, Middleton and Rothwell in 2001. He has served on the Environmental Audit Select Committee since 2001, launched a private members bill promoting Domestic Tradable Quotas in 2004, won the first Parliamentary Renewable and Sustainable Energy Group (PRASEG) House of Commons Award in 2005, and is Chair-elect of the All Party Parliamentary Group on Intelligent Energy. He is a founder of the All Party Group on Climate Change which has just been launched.

Tina Fawcett

Senior researcher at the Environmental Change Institute, University of Oxford, working within the UK Energy Research Centre. Her research focuses on household energy use, UK carbon emissions and personal carbon rations / allowances. She has recently completed PhD research on this topic at UCL, and is co-author with Mayer Hillman of a book about carbon rationing: *How We Can Save the Planet* (Penguin, 2004).

Tony Grayling

Associate director of and head of the sustainability team at the Institute for Public Policy Research (ippr) since 2002. His work mainly focuses on energy, transport and climate change. He joined ippr as a research fellow in 1999. From 1997-98 he was a special adviser to the Minister for Transport, Gavin Strang MP during the development of the transport White Paper *A new deal for transport*. He was environment policy officer for the Labour Party from 1994-97 and before that a researcher successively to Labour MPs Ron Davies and Anne Campbell.

Mayer Hillman

Head of the Environment and Quality of Life Research Programme from 1970, when he joined Policy Studies Institute, to 1992 when he was appointed Senior Fellow Emeritus of the Institute. His research has been concerned with transport, urban planning, energy conservation, health promotion, road safety, environment and climate change policies. He is the author or co-author of more than 40 books on these topics. He was one of the first proponents of carbon rationing as the only realistic way for the world's population to limit damage from climate change. Together with Tina Fawcett, he completed a book on this subject last year. It was commissioned by Penguin Books and published under the title *How We Can Save the Planet*.

Chris Jardine

Researcher at the Environmental Change Institute since 2001. His research has been primarily concerned with the technical performance solar photovoltaics, and his research produced a laymans guide "Photovoltaics in the UK". Other research interests include the role of non-CO2 greenhouse gases such as methane, the integration of renewables into the electricity network, and wider aspects of renewable energy policy. He serves on the committee of UK-ISES, the UK branch of the Solar Energy Society, and is also involved in projects promoting awareness of renewable energy and climate change issues in schools.

Roger Levett

Partner in Levett-Therivel, sustainability consultants. He drafted the LGA's 1998 manifesto Energy services for sustainable communities and the 2005 LGA/Energy Saving Trust Long term vision on sustainable energy and climate change. His publications include A better choice of choice (Fabian Society, 2003, with Ian Christie, Michael Jacobs and Riki Therivel) and Towards the Ecopolis (Demos/Comedia 1998, with Ian Christie). Recently, he has assessed the UK's progress for the Sustainable Development Commission and carried out Sustainability Appraisals and Strategic Environmental Assessments of various regional and local plans and strategies, and has worked on sustainable consumption, housing, transport and planning.

Caroline Lucas

Green Member of the European Parliament for S.E. England since 1999 and Principal Speaker for the Green Party. As Member of the Committee on the Environment, Public Health and Food Safety, her work has included amending legislation to strengthen the case against GM crops, pushing for stricter controls on the regulation of chemicals, and making the case for stricter targets on CO2 emissions to combat climate change. Inter alia, she is a Member of the Committee on International Trade, Vice-President of the Animal Welfare Intergroup, President of the Globalisation Intergroup, and Vice-President of the newly formed Consumer and Health Intergroup. Recent publications include the pamphlet, co-authored with Mike Woodin, Taking the Cons out of the Constitution and Green Alternatives to Globalisation: a manifesto.

George Monbiot

Weekly columnist for the Guardian newspaper and author of the best selling books *The Age of Consent: a manifesto for a new world order* and *Captive State: the corporate takeover of Britain*. He has held visiting fellowships or professorships at the universities of Oxford (environmental policy), Bristol (philosophy), Keele (politics) and East London (environmental science). He is currently visiting professor of planning at Oxford Brookes University. In 1995 Nelson Mandela presented him with a United Nations Global 500 Award for outstanding environmental achievement.

Derek Osborn

A senior environmentalist advising on long-term strategic issues for governments, international bodies, business and the voluntary sector. In the public sector, he is currently a Commissioner for the Sustainable Development Commission. From 1990 to 1995 he was Director General of Environment Protection in the Department of the Environment. From 1994 to 1999 he was chair of the European Environment Agency. In the business sector Derek Osborn is a non-Executive Director of Severn Trent plc, and chairs the Board's Environment Committee. He chairs Jupiter Global Green Investment Trust. He also provides environmental advice to ERM CVS, Innovest and WS Atkins. In the voluntary sector he is Chairman of UNED-UK Forum. In addition, he is a visiting professor at the School of Public Policy, UCL.

Malcolm Rigg

Appointed Director of Policy Studies Institute in 2004. In his career, he has covered a wide spectrum of the social and market research world as practitioner, commissioner and manager. He was Head of Social Research then Managing Director of BMRB International, Director of Research at COI Communications, Head of Public Interest Research at Consumers' Association and a Senior Fellow at the Policy Studies Institute. He is a Fellow of the Market Research Society and a former chair both of its Professional Standards Committee and its Professional Development Advisory Board. He has published and spoken on a diverse range of subjects including training and development, the graduate labour market, the provision of government services and evidence-based policy and practice.

Robin Stott

Before retirement, worked as a physician in Lewisham university hospital, a community-based teaching hospital in South London. In addition to his clinical practice, he served as Medical Director and site Dean for ten years. As a result of his long-standing interest in the overlap between the economic, environmental and social circumstances which underpin both healthy and sustainable societies, he was appointed a member of the London Sustainable Development Commission, and sustainability advisor to the elected mayor of Lewisham. He is vice-chair of Medact, a global health charity which undertakes research and advocacy on the health implications of violent conflict, economic disparities and environmental change.

Attendees

This list is correct to the best of our knowledge.

Jo	Abbes	IT manager	Workface Energy Consultants
Tanzeed	Alam		CarbonSense
Keith	Allot	Features editor	The ENDS report
Jillian	Anable	Senior researcher	Robert Gordon University
Kevin	Anderson	Decarbonising Modern Societies (Tyndall)	University of Manchester
Karen	Anderton	Researcher	The Climate Group
David	Begg	Professor	Robert Gordon University
Brenda	Boardman	Head, Lower Carbon Futures	Environmental Change Institute, University of Oxford
Bill	Bordass	Director	William Bordass Associates
Christian	Brand	Researcher	Environmental Change Institute, University of Oxford
James	Bruges	Architect and author	
Chris	Bryant		DTi
Golnaz	Bybordi	Administrator	UKERC
Colin	Challen	MP	
Martin	Chilcott	Martin Chilcott Consulting	(Green Valley)
Robert	Cohen		Energy for Sustainable Development
Paul	Crake	Programme director	Royal Society for the Encouragement of Arts, Manufactures and Commerce
Julian	Darley		Post-Carbon Institute
Sarah	Darby	Researcher	Environmental Change Institute, University of Oxford
Richard	Douthwaite	Economist, journalist and author	The Foundation for the Economics of Sustainability (FEASTA)
Simon	Dresner	Researcher	Policy Studies Institute
Duncan	Eggar		Defra
Tina	Fawcett	Senior researcher	Environmental Change Institute, University of Oxford
David	Fleming	Independent policy analyst and author	
Herbie	Girardet		World Future Council
Tony	Grayling	Associate Director	Institute of Public Policy Research
Chris	Groven		BP
Barbara	Hammond		Office of Science and Technology
Mayer	Hillman	Senior Fellow Emeritus	Policy Studies Institute
David	Hirst		Hirst Low Carbon Solutions Ltd
Christian	Jardine	Senior researcher	Environmental Change Institute, University of Oxford
Peter	Jones		BIFFA
Rudra	Kapila	Assistant	UKERC Meeting Place
Sarah	Keay-Bright	Manager	UKERC Meeting Place

Gavin	Killip	Researcher	Environmental Change Institute, University of Oxford
Tim	Lang	Professor of Food Policy	City University London
Matthew	Leach	Lecturer in Energy Policy and Technology	Environmental Policy and Management Group, Imperial College
Matthew	Ledbury	Deputy Editor	Local Transport Today
Roger	Levett	Partner	Levett Therivel Sustainability Consultants
John	Loughead	Executive Director	UKERC
Caroline	Lucas	MEP	
Peter	Luff	Director, Action for a Global Climate Community	One World Trust
Don	Mathew		Sustrans
Aubrey	Mayer	Director	Global Commons Institute
Catherine	Mitchell	Principal Research Fellow	Warwick Business School
George	Monbiot	Author and Guardian columnist	
Tadj	Oreszczyn	Director of Environmental Design and Engineering	The Bartlett, University College London
Derek	Osborn	Commissioner	Sustainable Development Commission
Walt	Patterson	Associate Fellow, Sustainable Development Programme	Royal Institute of International Affairs
Adam	Poole	Reader	Whitby Bird Engineers
Alison	Pridmore		Sustainable Development Commission
Roger	Read	Chartered architect and town planner, Secretary General of METREX	METREX - Network of European Metropolitan Regions & Areas
Trewin	Restorick	Director	Global Action Plan UK
Malcolm	Rigg	Director	Policy Studies Institute
Elliot	Robertson		Environment Agency
Harry	Rutter	Head of Health Impact Assessment	South East Public Health Group
Robert	Shaw	Policy officer	Town & Country Planning Association
Ashok	Sinha	Director	The Climate Movement
Jim	Skea	Research Director	UKERC
Liz	Sleeper	Assistant to Norman Baker MP	
Richard	Starkey	Decarbonising Modern Societies (Tyndall)	UMIST
Robin	Stott	Sustainability Advisor to Mayor of London and Deputy Chair	
Lex	Waspe	Communications Manager	UKERC
Helen	Watters	Researcher	Leeds University
Chris	West	Director	UKCIP
Paul	Wilkinson		London School of Hygiene and Tropical Medicine